

Appl. No. 10/822,995
Atty. Docket No.: 2001B127B/2
Amdt. dated June 19, 2006
Reply to Office Action mailed April 3, 2006

REMARKS/ARGUMENTS

Claim Amendments

By the claim amendments presented, independent Claims 30 and 33 are rewritten to indicate that the heating fuel added to the regeneration zone to further heat the catalyst therein is a "liquid" heating fuel. Support for these amendments to Claims 30 and 33 can be found in Paragraph [0106] of the original specification.

Also by the claim amendments presented, independent Claims 30 and 33 are further rewritten to indicate that the recirculation of the further heated catalyst from the regeneration zone to the reaction zone serves to heat the reaction zone to a temperature of at least 316 °C. Support for these amendments to Claims 30 and 33 can be found in Paragraph [0050] of the original specification.

Upon entry of the amendments presented, Claims 30-35 remain in the application. No additional claims fee is due as a result of these amendments.

Invention Synopsis

The present invention as currently claimed in this application is directed to processes for adding heat to or initially increasing the temperature of a reactor system for converting oxygenates to olefins. This is accomplished by heating catalyst in the catalyst regeneration zone of such a reactor system by combusting a liquid heating fuel which is added to the regeneration zone along with the catalyst. The liquid heating fuel is one which must have certain specified autoignition characteristics. This liquid fuel, unlike gas oil fuels typically used to heat regenerated catalyst in FCC processes, must have no more than certain maximum amounts of contaminants such as sulfur, nitrogen, nickel, and vanadium which should not find their way back to the OTO reactor. Catalyst taken from the reaction zone and heated in this manner in the regeneration zone is then circulated back to the oxygenates-to-olefins (OTO) reaction zone where it serves to heat the reaction zone to a temperature of at least 316 °C. This procedure can thus be used to add heat to the OTO reactor either during initial startup or during periods of feed interruption.

Appl. No. 10/822,995
Atty. Docket No.: 2001B127B/2
Amdt. dated June 19, 2006
Reply to Office Action mailed April 3, 2006

Art Rejection

In the instant Office Action the Examiner has maintained the same pre-RCE rejection of Claims 30-35 under 35 USC §103(a) as being allegedly unpatentably obvious over Lattner et al. (U.S. Patent No. 6,023,005, hereinafter "Lattner") in view of Harandi et al. (U.S. Patent No. 4,939,314, hereinafter "Harandi"). The Examiner reiterates his position that it would have been obvious to add heating fuel to the catalyst regeneration zone of the Lattner OTO set-up in view of the Harandi disclosure of generally characterized "fuel gas" added to the regenerator of the Harandi oligomerization process, to thereby arrive at Applicants' claimed processes. Such a rejection is again respectfully traversed as it would apply to the claims as amended herein.

By way of review, Lattner discloses an oxygenates-to-light olefins (OTO) process wherein a catalyst regenerator is used to remove coke deposits from only a portion of the total catalyst inventory in the OTO reaction zone so as to improve selectivity of the process to production of light olefins. Lattner, however, does not mention the problem of having to add heat to the OTO reaction zone either during periods of initial reactor start-up or during interruption in oxygenate feed when there may be a need maintain heat within in the OTO reaction zone.

Harandi discloses a high pressure olefin oligomerization process, e.g., the Mobil Olefins to Gasoline (MOG) process or the Mobil Olefins to Distillate (MOD) process or the Mobil Olefins to Lubes (MOL) process, which includes an on-line low pressure catalyst regeneration set-up. Catalyst from and to the Harandi oligomerization reactor is passed through pressure adjusting lock hoppers (and a stripping zone) to and from a low pressure catalyst regenerator. For purposes of temperature control in the catalyst regenerator, and while recirculating catalyst is being held and processed in the lock hoppers or a stripping zone, Harandi discloses very generally that a fuel gas may be added to the regenerator to maintain an appropriate temperature in the regenerator. Harandi, like Lattner, discloses nothing concerning the need to add heat to the Harandi oligomerization reaction zone during either initial start-up or during interruption in oligomerization feed.

Applicants have addressed the Examiner's basic position concerning the combined teachings of these Lattner and Harandi references and have provided a number of points of

Appl. No. 10/822,995
Atty. Docket No.: 2001B127B/2
Amdt. dated June 19, 2006
Reply to Office Action mailed April 3, 2006

argument in previous responses during pre-RCE prosecution. Instead of burdening the record by repeating many of those same arguments here, Applicants would simply address herein the Examiner's latest comments made in response to Applicants' previous arguments, and particularly Applicants would now address how those comments may be affected by the claim amendments presented herein.

The fundamental difference between the presently claimed invention and the Harandi teaching with respect to the use of regenerator heating fuel is clear. In Applicants' invention, heating fuel is used to provide extra heat to regenerated catalyst which then carries this added heat back to the OTO reactor. Harandi, on the other hand, only uses heating fuel in the regenerator to add heat to the regenerator. The fuel gas as used in Harandi is thus analogous to and serves the same purpose as the "starting fuel" mentioned in Applicants' specification but is not the same as or analogous to the "liquid heating fuel" which is an element of Applicants' claimed processes.

Applicants have urged that there is no teaching or suggestion in Harandi of the addition of any significant heat back to the Harandi oligomerization reactor by means of regenerated catalyst circulating back to the Harandi reactor. In response, the Examiner urges that Applicants do not quantify the amount of catalyst-carried heat which their process embodiments provide to the OTO reactor. By the amendments presented herein, Applicants now do specify that the further heated catalyst recirculating from the regenerator serves to heat the OTO reaction zone to a temperature of at least 316 °C. (By contrast, the oligomerization reaction carried out in the reaction zone of Harandi can be run at temperatures as low as 204 °C.) It is submitted that the claim amendments presented herein make it even clearer that modification of the Lattner process by using the type of regenerator heating mentioned in Harandi does not result in Applicants' claimed invention.

The process embodiments claimed herein now specify that the heating fuel used in the regenerator must be a liquid and must have the requisite minimized amounts of sulfur, nitrogen and metal contaminant compounds. Clearly the Harandi reference does not teach or suggest the use of "liquid" heating fuel since the material Harandi discloses is called a fuel "gas."

Appl. No. 10/822,995
Atty. Docket No.: 2001B127B/2
Amdt. dated June 19, 2006
Reply to Office Action mailed April 3, 2006

With respect to the minimization of contaminants in the fuel added to the regenerator, the Examiner reiterates that Harandi discloses no contaminants in its "fuel gas" and urges that it would be obvious to avoid ingredients that are not disclosed in the cited art. It is well known, however, that liquid fuels such as gas oils which are typically added to and burned in the catalyst regenerators of other processes such as fluid catalytic cracking (FCC) do commonly contain materials such as sulfur, nitrogen and possibly metal compounds. Applicants have discovered that such conventional liquid fuel materials cannot be used to heat catalyst in the regenerator of an OTO process unless those typically present contaminants are first removed or appropriately reduced. There is certainly nothing in Harandi (which does not relate to an OTO process and which does not use liquid fuel) that would teach or suggest this essential feature of applicants' claimed process.

Given the foregoing considerations as well as those provided in applicants' previous responses, it is again submitted that the reference combination of Lattner in view of Harandi is not one which is properly made in rejection of Applicants' claims in the first place. Again, this is because neither reference mentions the problem which applicants' invention addresses or the advantages which applicants' invention provides with respect to that problem. Furthermore, it is now even clearer that even when the disclosures of Lattner and Harandi are considered together, the combined teachings of these two patents still do not suggest the particular process embodiments set forth in applicants' Claims 30-35 as presently written. Continued rejection of these amended claims under 35 USC §103(a) over Lattner in view of Harandi would therefore be improper.

Appl. No. 10/822,995
Atty. Docket No.: 2001B127B/2
Amdt. dated June 19, 2006
Reply to Office Action mailed April 3, 2006

CONCLUSIONS

Applicants have again made an earnest effort to place their application in proper form and to distinguish their claimed invention from the applied prior art. WHEREFORE, entry of the amendments presented herein, consideration of Applicants' remarks concerning the applied art rejection, as well as allowance of amended Claims 30-35, are all respectfully requested.

Any comments or questions concerning the application can be directed to the undersigned at the telephone number given below

Respectfully submitted,

Date: _____

6/19/06



David M. Weisberg
Attorney for Applicants
Registration No. 57,636

Post Office Address (to which correspondence is to be sent):
ExxonMobil Chemical Company
Law Technology
P.O. Box 2149
Baytown, Texas 77522-2149
Telephone No. (281) 834-0599
Facsimile No. (281) 834-2495